

CLAIMS

1. An electric motor control system comprising:
a stator for producing a magnetic field;
a surface mount permanent magnet rotor rotated by said magnetic field;
5 a motor shaft coupled to said rotor;
power electronics for controlling said magnetic field in said stator; and
wherein said power electronics controls the q-axis and d-axis current components for the electric motor.
2. The electric motor control system of Claim 1 wherein said stator includes current carrying coils to generate said magnetic field.
3. The electric motor control system of Claim 1 wherein said surface mount permanent magnet rotor includes rare earth magnets.
4. The electric motor control system of Claim 1 wherein said power electronics comprises a voltage source inverter.
5. The electric motor control system of Claim 1 further comprising a controller controlling said power electronics, said controller including a control block to control the d-axis current as a function of the angle β .
6. A method of controlling an electric motor comprising:
providing an electric motor having a wound stator, a rotor magnetically coupled to said wound stator, said rotor including surface mount permanent magnets;

- 5 controlling q-axis current in the stator; and
 controlling d-axis current in the stator.

7. The method of Claim 6 wherein the step of controlling the q-axis current in the stator comprises controlling the q-axis current as a function of the angle β .

8. The method of Claim 6 wherein the step of controlling the d-axis current in the stator comprises controlling the d-axis current as a function of the angle β .

9. The method of Claim 6 further comprising the step of controlling the position of the electric motor.

10. A method of controlling an electric motor comprising:
 providing an electric motor having a wound stator, a rotor magnetically coupled to said wound stator, said rotor including surface mount permanent magnets;

- 5 providing a vector controller and voltage switched inverter to provide stator current to the wound stator; and
 controlling the q-axis and d-axis current components of the stator current to control the torque of the electric motor.

11. The method of Claim 10 further comprising the step of determining the position of said rotor.

12. The method of Claim 11 further comprising the step of determining the actual current of the electric motor.

13. The method of Claim 12 further comprising the step of calculating the d-axis current setpoint as a function of the angle of the stator current vector with reference to the q-axis.

14. The method of Claim 13 further comprising the step of calculating the q-axis current setpoint as a function of the angle of the stator current vector with reference to the q-axis.